

Claims

- [c1] The Shoulder Protection System is designed to dissipate impact forces and redirect any residual forces to the strongest load bearing part of the body, the upper back and medial shoulder.
- [c2] A collar section surrounding and protecting the neck is formed using semi rigid material. The collar and the protective padding beneath it are anatomically specifically contoured so that this collar and padding assembly rests at the base of the neck posteriorly and arcs anteriorly on the sides of the neck across the trapezius muscle and the clavicle and anteriorly across the superior aspect of the sternum. The collar and padding supports the entire protection system and is the only point of direct contact across the shoulder.
- [c3] The collar is formed to bridge over the clavicle (collar bone), without padding, creating a protective channel for this bone.
- [c4] The collar is formed to bridge over the Sternum creating a protective channel for the superior aspect of this bone.
- [c5] The collar is rounded on the sides of the neck in an outward facing "U" shape. The lower portion if the "U" rests on foam padding that rests squarely on the body as stated in Claim 1. The upper portion of the "U" provides a spring platform that Epaulet 1 is rigidly affixed to.

- [c6] The collar is formed to create parallel anterior and posterior articulation pivot points for the support arms of epaulet 2.
- [c7] The collar is rounded posteriorly in an outward facing "U" shape. The lower portion of the "U" rests on foam padding that rests squarely on the body as stated in Claim 1. The upper portion of the "U" provides a cushion for the head or helmet when the neck is extended.
- [c8] The position and shape of the inside (or medial?) aspect of the sides of the collar create a protective space for the plexus of nerves exiting the neck at Erb's Point.
- [c9] The contiguous rigid design of the collar prevents forces from collapsing the protective space into the plexus of nerves exiting the neck at Erb's Point.
- [c10] The location and design of epaulet 1, 2 and 3 provide for unrestricted movement of the shoulder in the flexion and rotational plane.
- [c11] Epaulet 2 is supported by two swinging arms pivoted off of the collar. One of the arms is anterior and the other is posterior.
- [c12] The downward motion of epaulet 2 is restricted by epaulet 1 and stop bars attached to the anterior and posterior aspects of the collar section.
- [c13] Epaulet 2 has webbing attached in the anterior-posterior plane

on its inferior aspect to smoothly transfer any force from an impact.

- [c14] Epaulet 3 is connected to epaulet 2 by elastic means allowing for it to rise up and out of the way when the arms are raised (shoulder flexion) and to spring down into a protective position when the arms are lowered.
- [c15] This 3 epaulet system creates a supported channel of space between the epaulets and the superior shoulder from the outside (or lateral?) aspect of the collar allowing the shoulder pads to flex and absorb the impact before the shoulder is contacted. This configuration in combination with the collar configuration of Claim 3 forms a complete protective channel for the entire length of each collar bone (clavicle).
- [c16] The padding laminate is constructed in such a way as to create an evaporative cooling effect in hot temps and an insulating effect in cold temps.
- [c17] There is padding at each point of contact with the body with the protective semi rigid shell on the outside. The semi rigid shell is curved to increase the shock absorbing capacity around all vital areas. Padding is used on the sides of the spine to increase the protective capability of the spine channel (cavity) [Claim 25]. Additionally, padding is positioned on the outside border of the sternal plate [Claim 22] to increase the protective capability of the

cavity created in this plate to protect the breast bone (sternum) and heart.

- [c18] Padding is "O" shaped around the borders of the sternal plate, with wing flaps to protect the body from the connecting buckles.
- [c19] Padding under Epp2 extends anteriorly to protect the pectorals muscle and AC joint and posteriorly to protect the scapula.
- [c20] The Acromio Clavicular (AC) Joint is further shielded with semi rigid material sewn into the anterior aspect of the padding.
- [c21] The Sternal Plate is horizontally hinged off of the collar's anterior section. This configuration provides a snug fit, freedom of torso rotational movement and chest expansion when breathing. This configuration reduces the "handle" available for an opponent.
- [c22] The Sternal Plate is anatomically specifically contoured to the pectoral muscles. The Sternal Plate contains a space (cavity) over the sternum and heart. Padding beneath the Sternal Plate is configured in an "O" shape around the plate perimeter. This configuration greatly softens any blow to this area and redistributes the impact over the entire anterior portion of the strong chest muscles.
- [c23] The hinged movement of the Sternal Plate over the frontal (anterior) aspect of the collar allows complete access to the chest if injury occurs. As necessary, the plate can be flipped

completely up and out of the way.

- [c24] The Back Plate is horizontally hinged off of the collar's posterior section. This configuration provides a snug fit to the specific anatomical contours of the musculature of the back, freedom of torso rotational movement and chest expansion when breathing. This configuration reduces the "handle" available for an opponent.
- [c25] The Back plate is anatomically specifically contoured to the natural curve of the back, the scapula and lattisimus dorsi. The Back Plate contains a space (cavity) over the spine. Padding beneath the Back Plate is configured in an "O" shape around the plate perimeter. This configuration greatly softens any blow to this area and redistributes the impact over the entire posterior portion of the strong back muscles.
- [c26] Semi rigid posterior flaps are connected to the Back Plate in opposing diagonal direction with hinged material. These flaps are positioned to provide maximum impact protection to the kidney region of the back while contouring to the more superficial back musculature.
- [c27] Side straps are elastic in nature. They connect the front and the back panels at their inferior lateral aspect on each side. A quick disconnect style buckle is positioned anteriorly on each side. This configuration allows for a quick entry, a snug, comfortable fit

across the back and chest areas and easier breathing. It also eliminates the possibility of abrading (scraping) the wearer.

- [c28] The contour of epaulet 2 allows for unrestricted medial flexion of the shoulder.
- [c29] The padding laminate and semi rigid materials have a ventilation system designed to keep the wearer cool.
- [c30] The exterior shell components are specifically designed to facilitate anatomical fit, impact resistance and vital area protection. Therefore some components are flexible to provide a contoured fit, increased upper body movement and shock absorption; while other components are rigid in order to provide maximum strength and impact resistance. All exterior shell components are shatter proof. All shell materials are light in weight without sacrificing impact resistance, shell integrity and vital protection
- [c31] The Front Medial arm of both epaulet number 2 is channeled at the pivot points to allow epaulets 2 and 3 to move forward with the shoulder as it moves